

In most organisms, behavioral and physiological events oscillate with period  $\pm 24$  h, i.e. exhibit circadian rhythms. In mammals, circadian rhythms are generated by circadian clock within the suprachiasmatic nuclei of the hypothalamus (SCN). Light entrains circadian rhythms to the 24 h period of solar day. Information about light is conveyed from the retina to the SCN and induces expression of clock genes Period1 (Per1) and Period2 (Per2) that represent photosensitive parts of molecular circadian clockwork within SCN. Light sensitivity of Per1 and Per2 within SCN is temporally restricted to the subjective night phase. In addition, daily profiles of clock gene expression within SCN are modulated by daylength, i. e. the photoperiod. The aim of our study was to elucidate how the mechanism of photic entrainment of the rat circadian clock develops during prenatal and early postnatal ontogenesis. Our results demonstrate that maternal circadian system provides information about external light to the fetal and early postnatal circadian clock. Circadian clock within the SCN of rat pups is light sensitive already at the first postnatal day. Mechanism gating the light sensitivity is present at postnatal day 3 and gradually matures until postnatal day 10. The data suggest that the developing retina is responsive to light at postnatal day 1, far before its morphological and functional maturation. Photoperiod begins to modulate daily profiles of clock genes within the SCN around postnatal day 10 and the mechanism of photoperiodic entrainment matures gradually.